Ingersoll-Rand Imperial Type 10 air compressors in London's Docklands

by R. J. M. Carr

Ingersoll-Rand Imperial Type 10 air compressors were in use for a remarkably long time. Three are known to have survived in London's Docklands until recently, one of these was still in working order in 1979. The last of the three remains out of use at Blackwall Yard.

From their inception c.1905 American built Ingersoll-Rand Imperial Type 10 air compressors have enjoyed a remarkably long life. This must be due in part to their rigid and robust construction and efficient lubrication system (Fig. 1).[1] While having the advantage of duplex operation they could be placed on foundations that did not require elaborate preparation because the cylinders and flywheel etc. were all mounted on a single solid box bed.

The air compressors illustrated in this article were all used in the ship repair industry,[2] where compressed air provided power for hand tools and riveting hammers etc., about the works and on board ships nearby; c.f. hydraulic power – "power at a distance". Certainly in the earlier part of this century electric power for portable tools was not always satisfactory; there were safety hazards for example. The Ingersoll-Rand duplex air compressor can be likened to a two cylinder horizontal cross compound steam engine working in reverse. Power comes in via a belt drive, in the cases illustrated here from an electric motor, and the output is compressed air at pressures of up to 100 p.s.i., the compression taking place in the cylinders in two stages. The steam engine analogy is further enhanced by the Corliss valve gear.

Two Ingersoll-Rand Imperial Type 10 air compressors survived in the heavy machine shop at the Royal Albert Dock works of River Thames Shiprepairs Ltd until 1980 (Fig. 2). One of these (Plates 1 to 4) was noted running during a visit on 30th May 1979 when the original instruction manual was said to be still in existence. The technical press showed interest in this machine surviving in working condition and a number of brief notes were published.[3–7] Attempts were made to save one of the Royal Albert Dock compressors but both were broken up in 1980 after the sale of machinery which took place on 24th July on the closure of River Thames Shiprepairs Ltd.

A third Ingersoll-Rand compressor in London's Docklands still survives out of use in the compressor house at Blackwall Engineering, Blackwall Yard (Fig. 3; Plates 5 to 7). It is hoped that this machine might be taken into store by the Museum of London.

Seeing the strong similarity in technology this short article should appeal to stationary steam engine enthusiasts. The Ingersoll-Rand Imperial Type 10 air compressor has been noticed by Industrial Archaeologists since at least 1973.[8] The author would be grateful to hear of the whereabouts of other surviving compressors of this type in London or elsewhere.

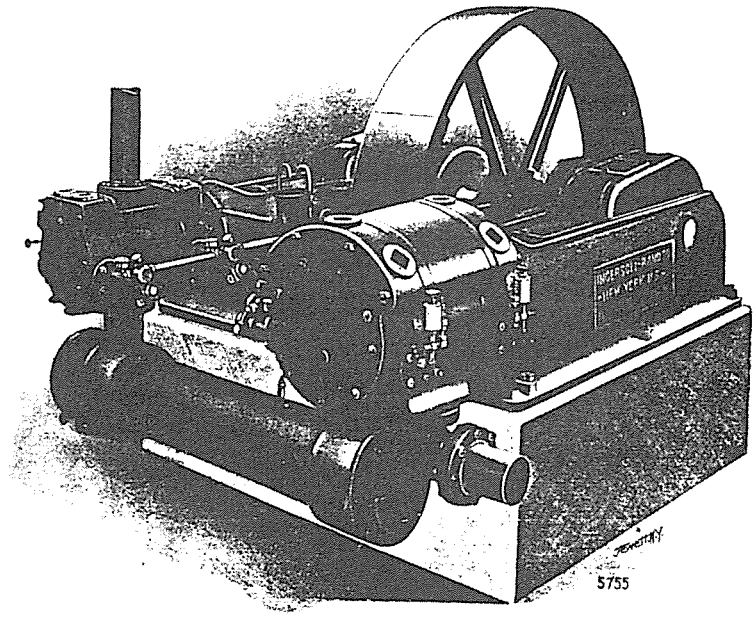

Fig. 1. *Illustration of Ingersoll-Rand "Imperial XB-2" Two Stage Air Compressor as it appeared in an engraving in reference 1 (i). Compare with plates 1-3 and 5-7*

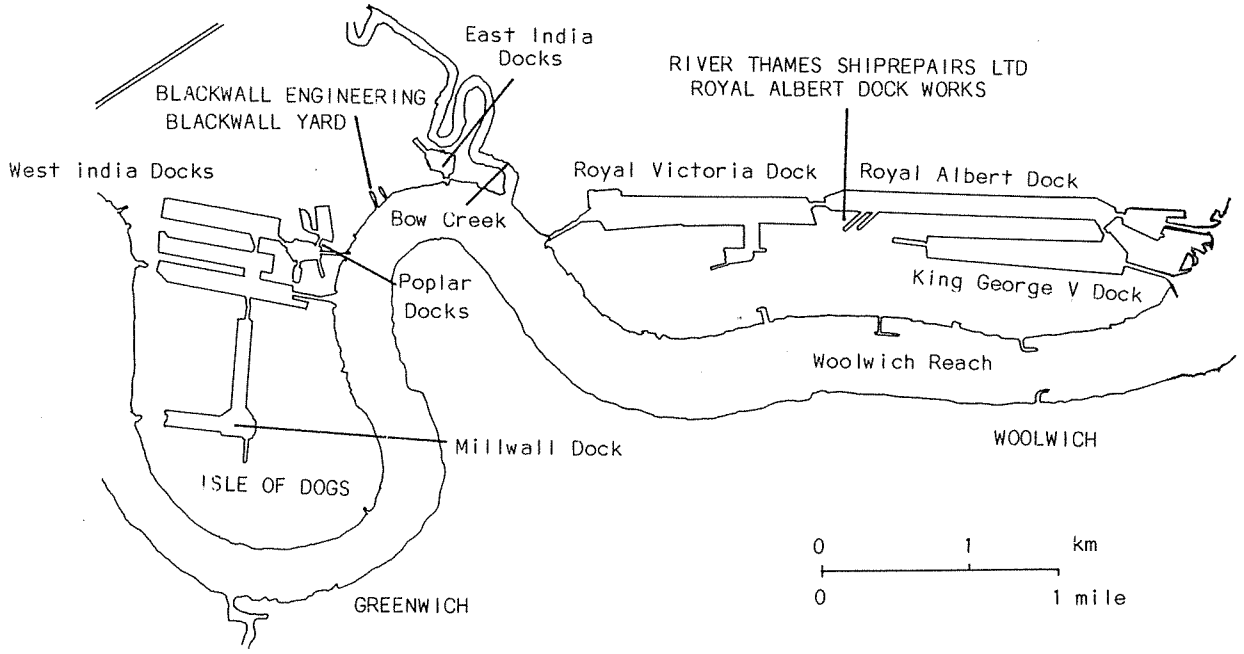

Fig. 2. *Sketch map showing location of Royal Albert Dock Works of River Thames Shiprepairs Ltd and Blackwall Engineering, Blackwall Yard in London's Docklands. Both ship repair yards were part of R & H Green and Silley Weir before the formation of River Thames Shiprepairs Ltd (RTS)*

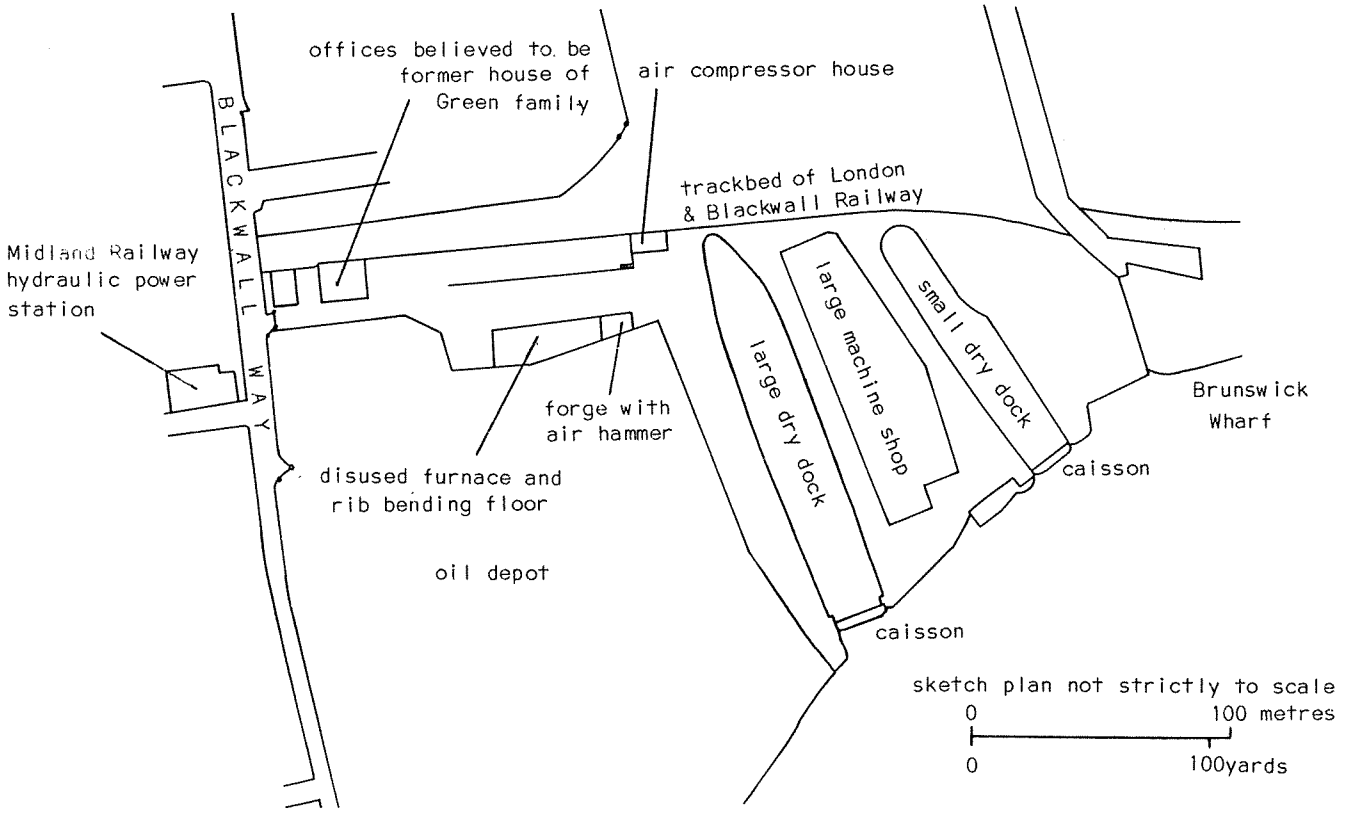

Fig. 3. *Sketch plan showing location of air compressor house, Blackwall Engineering, Blackwall Yard in relation to larger dry dock and smithery*

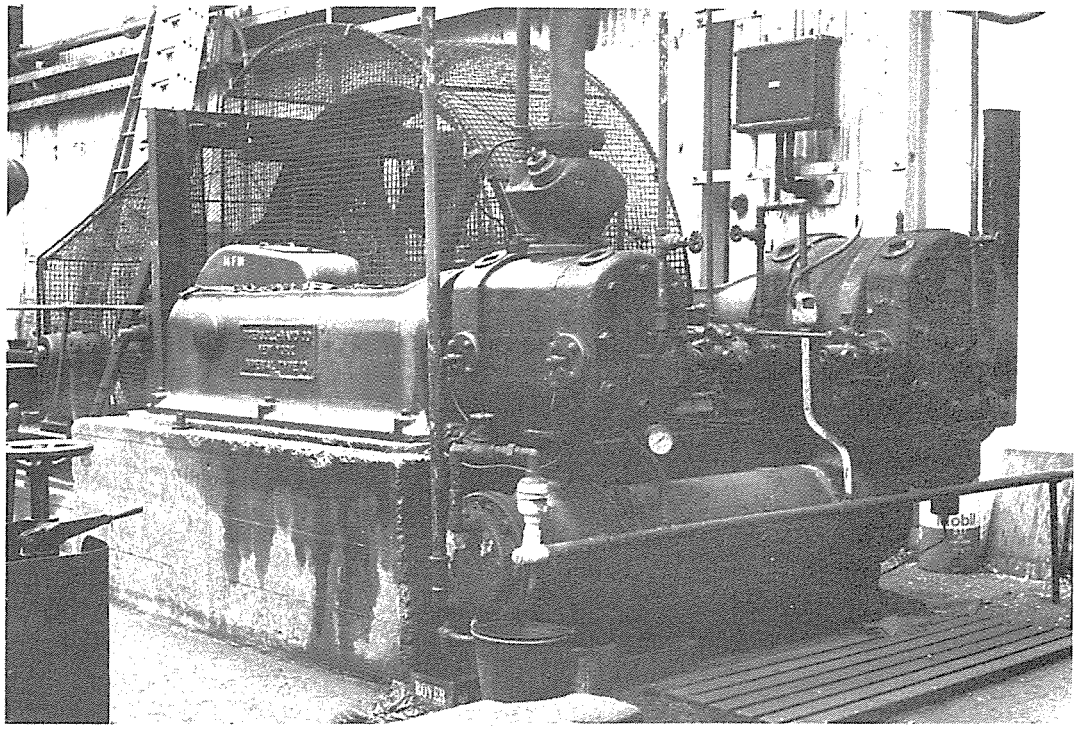

Plate 1. *Heavy machine shop, Royal Albert Dock works of River Thames Shiprepairs Ltd., 30.5.79, looking north; Ingersoll Rand Imperial Type 10 duplex air compressor. Note inter-cooler between cylinders; high pressure left hand, low pressure on right. Corliss valve gear on low pressure cylinder can be clearly seen in this view. Cylinder dimensions are 16'' × 14'' and 10'' × 14''. Flywheel is between cylinders. Number 14F91 is for sale catalogue; sale took place on 24.7.80. Compressor was 11 feet long and 7½ feet wide. Large pipe running upwards from the high pressure cylinder carried compressed air output*

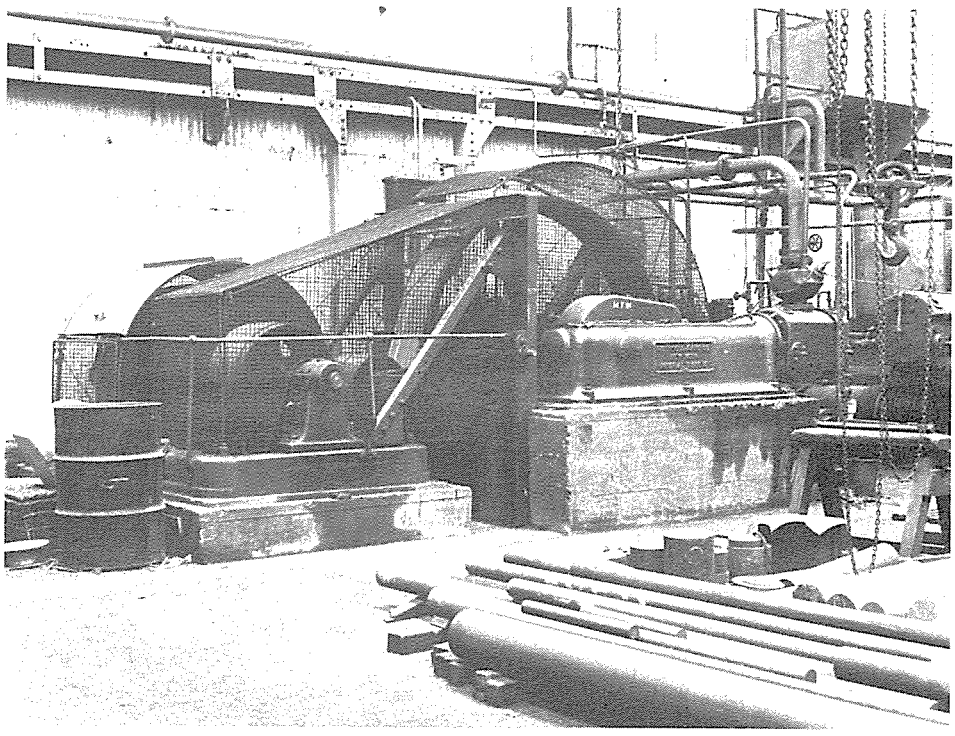

Plate 2. *This view of the same compressor shows on left the electric motor which provided power. Looking east, 30.5.79. On this date compressor was seen in action. The electric motor, by Bruce Peebles and Co., Edinburgh, was a 4 pole DC compound motor with interpoles, providing 100kW at 600rpm, 182/200 amps, 500/550 volts. It carried machine number 12450. This last working compressor at RTS Royal Albert Dock works supplied sufficient air for all general purposes, powered pneumatic hand tools, provided compressed air for blow-cleaning fabrications and air for the bellows in the blacksmith's shop. A ship repair yard must maintain all the main engineering facilities in full readiness. The yard itself carried out repairs and maintenance work for the compressors*

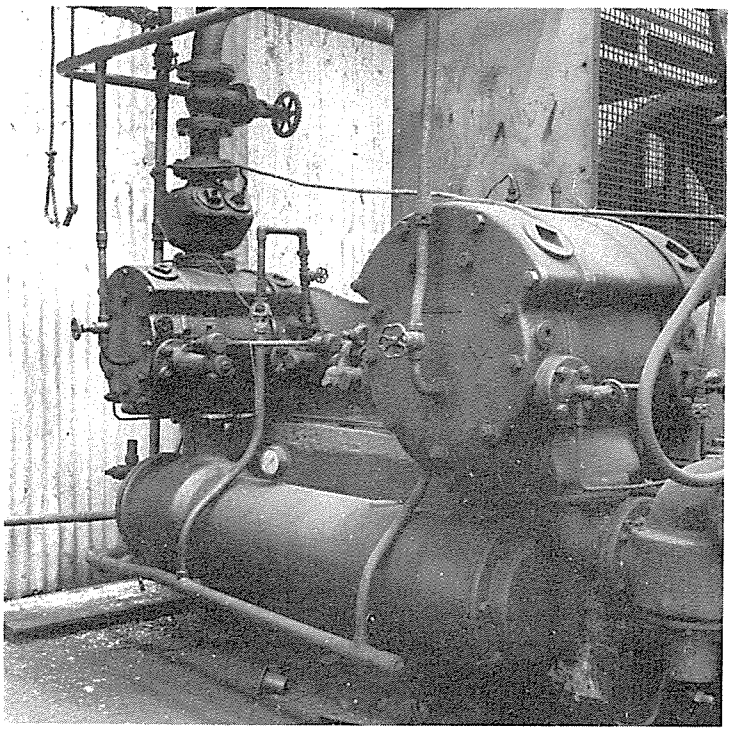

Plate 3. *Close view looking south east of cylinders and valve gear of the other type 10 air compressor at RTS Royal Albert Dock works out of use when photographed on 30.5.79. The two Ingersoll Road Imperial Type 10 air compressors were placed back to back. This machine, like its companion, was made in Painted Post, New Jersey, U.S.A. and was said to have been shipped to London shortly before World War I. In the blacksmith's shop next door (to the north) were two receivers to store the compressed air. These were about 20 feet high and 6 feet in diameter and had been converted from vertical boilers (see Plate 4)*

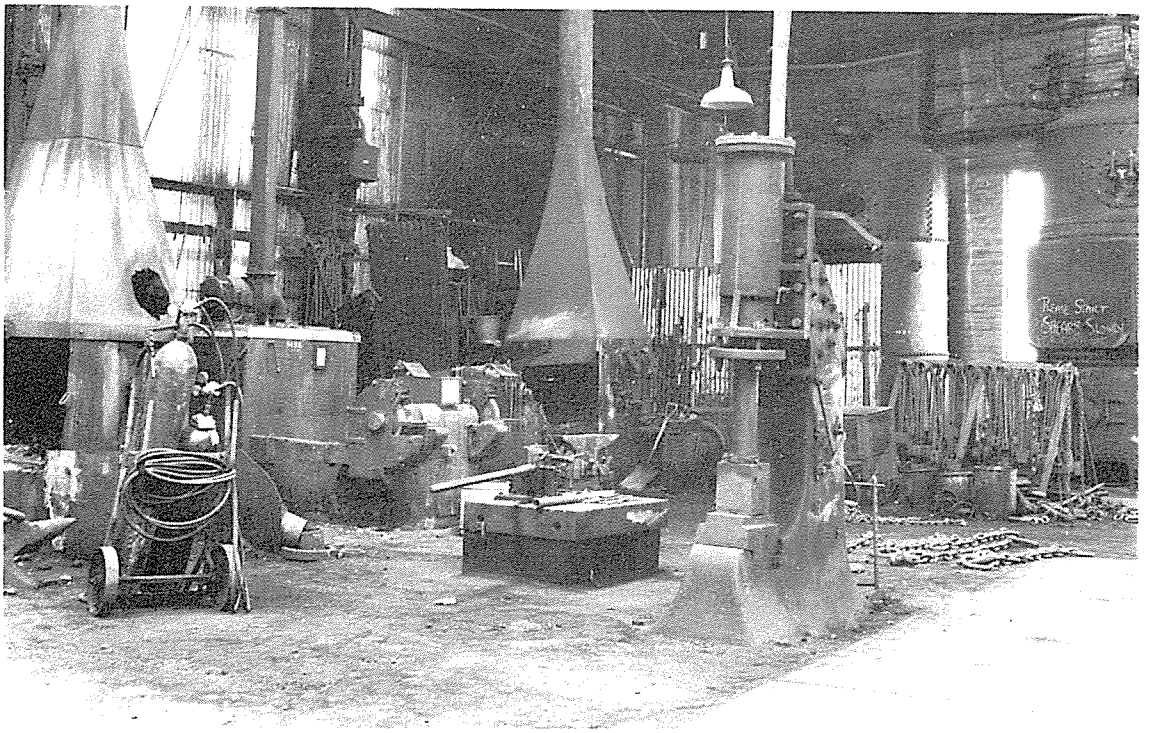

Plate 4. *Blacksmiths shop, Royal Albert Dock works of River Thames Shiprepairs Ltd, 30.5.79, looking west. The two air receivers previously mentioned are to the right of the picture. Also note hearths, anvil and numerous blacksmiths' handtools. The steam hammer (converted to run on compressed air), by R. Harvey of Glasgow dated 1888, is now in the Brunel enginehouse at Rotherhithe in the care of the Brunel Exhibition Project. This blacksmith's shop contained six hearths and had a fine period atmosphere*

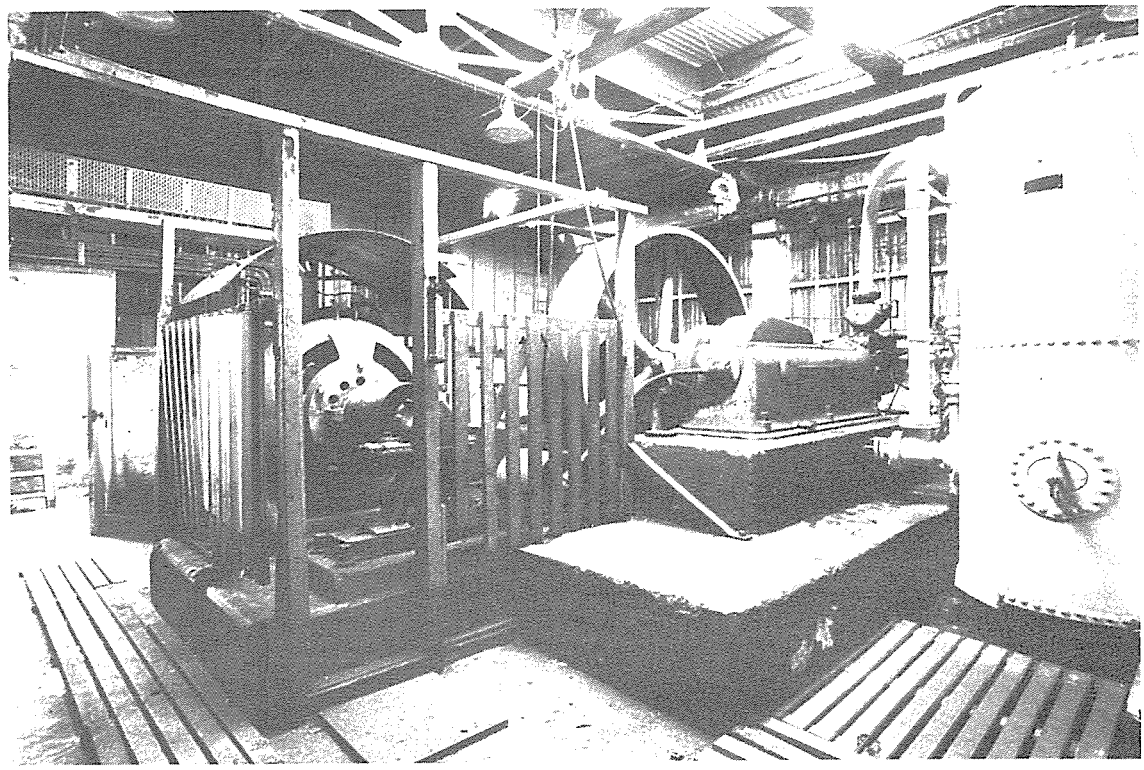

Plate 5. *Blackwall Yard, Blackwall Engineering, 18.6.82. This view inside the compressor house, looking north west, shows an electrically driven Ingersoll Rand Imperial Type 10 compressor similar to the ones broken up at RTS Royal Albert dock in 1980. Cylinders 16'' × 14'' and 10'' × 14''. The object on the left (resembling the face of a pig) is the electric motor, the broad belt which drove the compressor itself, to the right, has been removed. To the extreme right is an air receiver*

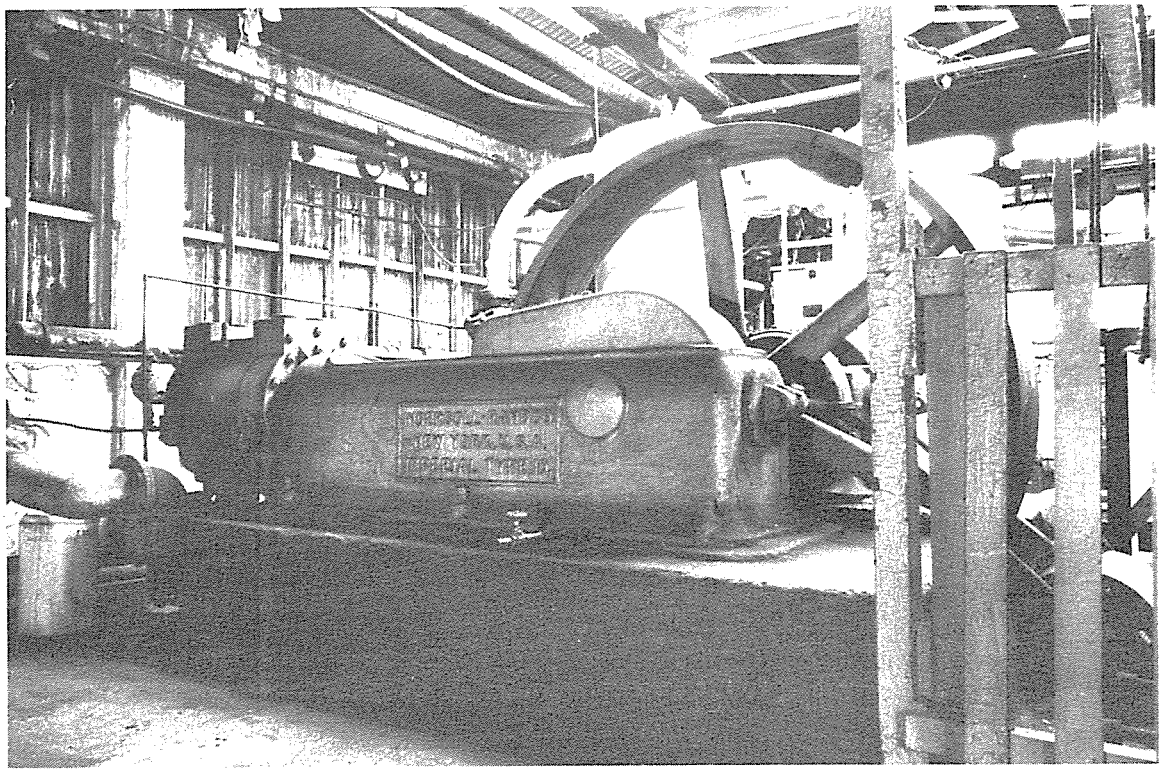

Plate 6. *Side view of Ingersoll Rand Imperial Type 10 air compressor at Blackwall Yard, looking north east, 18.6.82. As well as the air receiver depicted in Plate 5 there is a converted Galloway Lancashire boiler, about 20 feet long and 6 feet in diameter, number 8944*

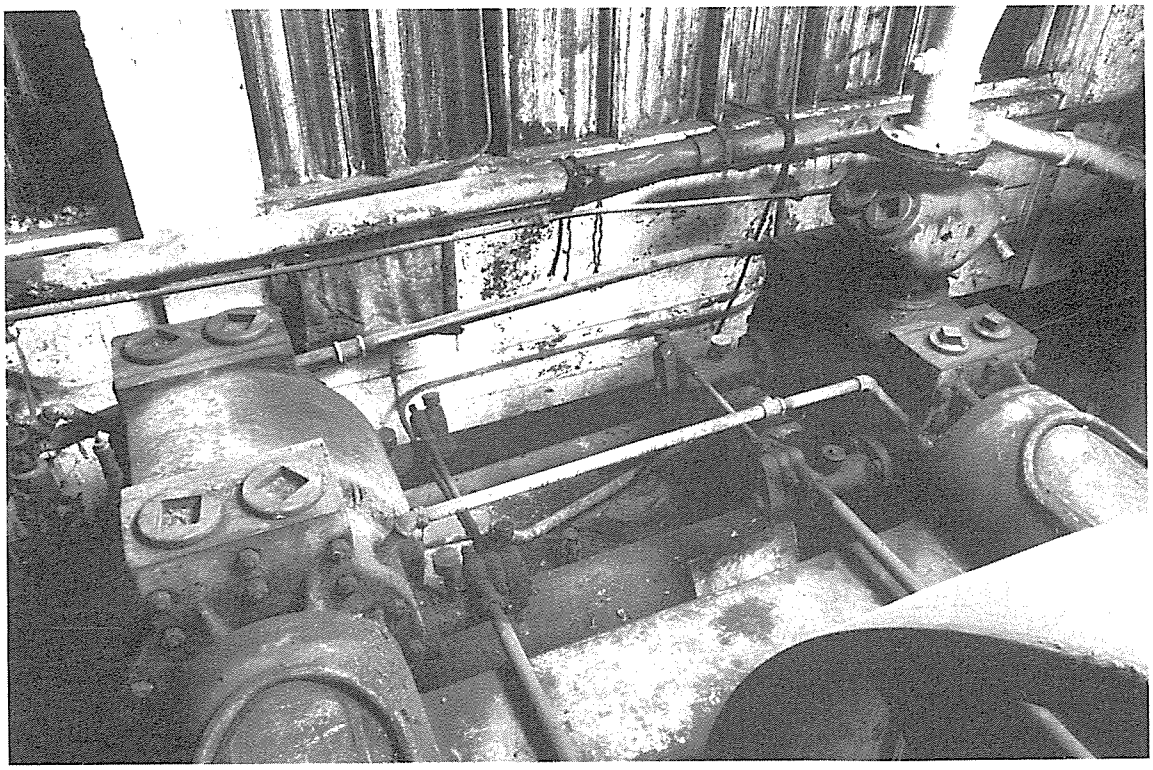

Plate 7. *Blackwall Yard, Blackwall Engineering, 18.6.82; close view of cylinders and valve gear of the Ingersoll Rand compressor, looking north. High pressure cylinder is to the right; note the pipe to carry compressed air output going out of top right hand corner of the picture. This view shows the Corliss valve gear clearly. The flywheel, bottom right, has the flat drive belt removed.*

Acknowledgements

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References and notes

1. Ingersoll-Rand Co USA, Collection of Catalogues *Rock Drills and Compressors etc. 1913-17,* (Trade Literature Collection), The British Library, Science Reference Library especially:
   (i) Ingersoll-Rand "Imperial XB" duplex power driven air compressors; form No.3312, 3rd edition, August 1914, 20pp and,
   (ii) Ingersoll-Rand "Imperial" Type 10 duplex power driven air compressors, instructions for installing and operating, form 548A, 2nd edition, December 1914, 20 pp.
2. A ship repair yard reminiscent of those on the Thames is described in the article 'Harland and Wolff's works at Southampton', *Engineer* July 17th 1908, pages 61-64 and two supplementary pages of illustrations. Much of the heavy equipment used in ship repair yards was built in the Glasgow area. For a general background see Moss, M. S. and Hume, J. R. *Workshop of the British Empire: Engineering and Shipbuilding in the West of Scotland*, Heinemann, 1977.
3. *Power and Works Engineering*, no. 30, December 1979, p.24.
4. *Industrial Management*, (ISSN 0007-6929); vol. 10, January, 1980, p.29.
5. *Hydraulic Pneumatic Mechanical Power*, (ISSN 0306-4069) vol.26, January 1980, p.41.
6. *Energy Manager,* vol.3, no.1, January/February 1980, p.20.
7. *Plant Engineering and Maintenance*, vol.4, no.4, May 1980, p.14.
8. See Bracegirdle, B. *The Archaeology of the Industrial Revolution*, reprinted with new index, Heinemann, 1974, p.109; especially plate 30d which depicts an Ingersoll-Rand Imperial Type 10 compressor in the quarries at Dinorwic, N. Wales. Here about six compressors installed c.1920 provided air for operating rock drills, a classic application of the Type 10. Its independence of well prepared foundations allowed numerous examples to be used in quarrying and tunnelling. (The first edition of Dr Bracegirdle's book appeared in 1973.)